

Talbot A. Chubb

APPARATUS AND PROCESS FOR GENERATING NUCLEAR HEAT

KNOWN PUBLICATIONS

"Electrochemically Induced Nuclear Fusion of Deuterium", M. Fleischmann and S. Pons, J. Electroanal. Chem., vol. 261, pp. 301-398, (1989).

"Deuterium Gas Loading of Palladium Using a Solid State Electrolyte", J-P Biberian and G. Lonchamp, Proc. ICCF9 (2002), in "Condensed Matter Nuclear Science", ed. by Xing Z. Li (Tsinghua University Press, China, 2003) pp. 17-22.

"Correlation between Behavior of Deuterium in Palladium and Occurrence of Nuclear Reactions Observed by Simultaneous Measurement of Excess Heat and Nuclear Products', Y. Iwamura, T. Itoh, N. Gotoh, and I. Toyoda, Proc. ICCF6, 274-281, (1996). Designated Iwamura et al. (1996).

"DETECTION OF ANOMALOUS ELEMENTS, X-RAY AND EXCESS HEAT INDUCED BY CONTINUOUS DIFFUSION OF DEUTERIUM THROUGH MULTI-LAYER CATHODE (Pd/CaO/Pd)", Y. Iwamura, T. Itoh, N. Gotoh, M. Sakano, I. Toyoda, and H. Sakano, Proc. ICCF7, 167-171, (1998). Designated Iwamura et al. (1998).

"Elemental Analyses of Pd Complexes: Effects of D₂ Gas Permeation", Y. Iwamura, M. Sakano, and T. Itoh, Jpn. J. Appl. Phys. 41A, pp. 4642-4650, (2002). Designated Iwamura et al. (2002)

"Low Energy Nuclear Transmutations in Condensed Matter Induced by D₂ Gas Permeation Through Pd Complexes: Correlation between Deuterium flux and Nuclear Product", Y. Iwamura, T. Itoh, M. Sakano, and S.

Kuribayashi, in ICCF10 Abstracts, Presentation Tu15, (2003). Designated Iwamura et al. (2003)

"Replication of MHI Transmutation Experiment By D₂ Gas Permeation Through Pd Complex", T. Higashiyama, M. Sukano, H. Miyamaru, and A. Takahashi, ICCF10 Proceedings preprint, distributed through www.LENR-CANR.org, pp. 1-6, (2003). Designated Higashiyama et al. (2003)

"The dd Cold Fusion-Transmutation Connection", T. A. Chubb, Proc. ICCF10, pp. 753-766, (2006). Designated T. A. Chubb "The dd Cold Fusion-Transmutation Connection"

"LENR: Superfluids, Self-Trapping and Non-Self-Trapping States" T. A. Chubb, Proc. ICCF10, pp. 767-770, (2006). Designated T. A. Chubb "LENR: Superfluids, Self-Trapping and Non-Self-Trapping States".

"Inhibited Diffusion Driven Surface Transmutations", Proc. ICCF 11, pp. 678-693, (2006). Designated T. A. Chubb "Inhibited Diffusion Driven Surface Transmutations."

DESCRIPTION OF PRIOR PUBLICATIONS

Referring to the known prior publications, Fleischmann and Pons, J. Electroanal. Chem., vol. 261, pp. 301-398, (1989), described studies demonstrating the release of nuclear heat in the cathode of an electrochemical cell in which deuterium ions (D^+ = mass-2 hydrogen ion = deuteron) were neutralized on the surface of a palladium cathode. Biberian and Lonchampt, Proc. ICCF9 (2002), in "Condensed Matter Nuclear Science", ed. by Xing Z. Li (Tsinghua University Press, China, 2003) pp. 17-22, described an apparatus and process for transferring deuterium from D₂ gas into and out of a metal using an electrically polarized solid electrolyte. Iwamura et al.

(1996) describes use of heavy water electrolysis cell to deposit deuterium on permeation plate reactor and to produce excess heat and nuclear products. Iwamura et al. (1998) describes use of heavy water electrolysis cell to deposit deuterium on permeation plate reactor containing internal CaO layers and demonstrating production of excess heat and nuclear products. Iwamura et al. (2002) describes means for creating a nuclearly active form of deuterium and for detecting its participation in exothermic nuclear reactions by means of a transmutation of surface cesium into surface praseodymium. Iwamura et al. (2003) reported on advances in expanding their use of nuclearly reactive deuterium and its participation in exothermic nuclear reactions, and in further confirming the identity of the transmutation product. Higashiyama et al. (2003) reported on replications of the Iwamura et al. process at Osaka University. All the previous cesium transmutation work had been carried out by Iwamura et al. at the Advanced Technology Research Center of Mitsubishi Heavy Industries. T. A. Chubb "The dd Cold Fusion-Transmutation Connection" describes theory modeling wavelike deuterons participating in exothermic nuclear reactions in/on a metal solid. T. A. Chubb "LENR: Superfluids, Self-Trapping and Non-Self-Trapping States" describes differences in ion behavior between ions in deep potential wells in metals and ions in shallow potential wells in metals. T. A. Chubb "Inhibited Diffusion Driven Surface Transmutations" models fusion processes and exothermic nuclear surface reactions taking place in Iwamura et al. (2002).

Talbot A. Chubb

APPARATUS AND PROCESS FOR GENERATING NUCLEAR HEAT

PUBLICATIONS CITED IN SUPPORT OF THE REALITY OF RADIATIONLESS COLD FUSION (Continuation in Part)

- "A New Energy caused by 'Spillover-Deuterium'", Y. Arata and Y.-C. Zhang,
Proc. Japan Acad. Vol. 70B, pp. 106-111 (1994).
- "Solid State Plasma Fusion ('Cold Fusion')", Y. Arata and Y.-C. Zhang, J. High
Temperature Soc. Japan. Vol. 23, pp. 1-28 (1998).
- "The Emergence of a Coherent Explanation for Anomalies Observed in D/Pd and
H/Pd Systems: Evidence for ^4He and ^3H Production", M. McKubre, F.
Tanzella, P. Tripodi and P. Hagelstein, Proc. ICCF8, F. Scaramuzzi Editor
(Italian Physical Society, Bologna, 2000) pp. 3-10.
- "Heat and Helium Measurements in Deuterated Palladium", M. H. Miles and B. F.
Bush, "Trans. Fusion Technol., Vol. 26, pp. 156-159 (1994).
- "Experimental Evidence of the ^4He production in a Cold Fusion Experiment", A.
De Ninno, A. Frattolillo, Z. Rizzo, E. Del Giudice, and G. Preparata, (ENEA
Centro Ricerche Frascati. C.P. 65 - 00044 Frascati, Rome, 2002) pp 2-27.
- "Quantum Motion of Chemisorbed Hydrogen on Ni Surfaces", M. J. Puska, J. R.
M. Nieminen, M. Manninen, B. Chakraborty, S. Holloway, and J. K.
Norskov, Phys. Rev. Lett. Vol. 51, pp. 1081-1084 (1983).
- "Hydrogen chemisorbed on nickel surfaces: a wave mechanical treatment of
proton motion", M. J. Puska and R. M. Nieminen, Surface Science Vol. 157,
pp. 413-435, (1985).

"Vibration Spectra of Atomic H and D on Cu(110): Evidence of H Quantum Delocalization", C. Astaldi, A. Bianco, S. Modesti, and E. Tosatti, Phys. Rev. Lett. Vol. 68, pp. 90-93 (1992).

DESCRIPTION OF PUBLICATIONS CITED IN SUPPORT OF THE REALITY OF RADIATIONLESS COLD FUSION

Referring to publications cited in support of the reality of cold fusion, the citations "A New Energy caused by 'Spillover-Deuterium'", Y. Arata and Y.-C. Zhang, Proc. Japan Acad. 70B, pp. 106-11 (1994); "Solid State Plasma Fusion ('Cold Fusion')", Y. Arata and Y.-C. Zhang, J. High Temperature Soc. Japan. Vol. 23, pp. 1-28 (1998); and "The Emergence of a Coherent Explanation for Anomalies Observed in D/Pd and H/Pd Systems: Evidence for ^4He and ^3H Production", M. McKubre, F. Tanzella, P. Tripodi, and P. Hagelstein, Proc. ICCF8, F. Scaramuzzi Editor (Italian Physical Society, Bologna, 2000) pp. 3-10 show experiments generating nuclear heat without energetic particle radiation in excess of one week. The second Arata and Zhang citation also identifies helium isotopes in post-run Pd powder. The McKubre et al. citation correlates generation of nuclear heat and generation of helium gas in an electrolysis study and in a study using palladium-on-carbon catalyst. The citations "Heat and Helium Measurements in Deuterated Palladium", M. H. Miles and B. F. Bush, "Trans. Fusion Technol.", Vol. 26, pp. 156-159 (1994) and "Experimental Evidence of the ^4He production in a Cold Fusion Experiment", A. De Ninno, A. Frattolillo, Z. Rizzo, E. Del Giudice, and G. Preparata, (ENEA Centro Ricerche Frascati. C.P. 65 - 00044 Frascati, Rome, 2002) pp. 2-27 show further experiments that correlate generation of nuclear heat with generation of helium gas at near the expected reaction energy of 24 MeV per helium atom. The citations "Quantum Motion of Chemisorbed Hydrogen on Ni

Surfaces", M. J. Puska, J. R. M. Nieminen, M. Manninen, B. Chakraborty, S. Holloway, and J. K. Norskov, Phys. Rev. Lett. Vol. 51, pp. 1081-1084 (1983); "Hydrogen chemisorbed on nickel surfaces: a wave mechanical treatment of proton motion", M. J. Puska and R. M. Nieminen, Surface Science Vol. 157, pp. 413-435, (1985); and "Vibration Spectra of Atomic H and D on Cu(110): Evidence of H Quantum Delocalization", C. Astaldi, A. Bianco, S. Modesti, and E. Tosatti, Phys. Rev. Lett. Vol. 68, pp. 90-93 (1992) show experiments in which deuterium atoms adsorbed on metal are excited into a changed geometric configuration called a "Bloch State", which resembles the geometric configuration assumed by the electrons in a metal which carry electric currents. This configuration is incompatible with the centralized configuration of nuclei participating in the kinetic impact nuclear reactions that produce energetic particles. Energetic particle and gamma ray emission is blocked, The geometry mismatch results in nuclear reaction energy being released in the form of heat.